

constructed by adjacently arranging like a plane a plurality of substrates on each of which thin film semiconductor elements which are two-dimensionally arranged are installed comprising:

    cutting a substrate, provided with a slice line and a guide line, along the slice line of the substrate;

    detecting the guide line during the cutting to detect deviation with respect to the guide line; and

    correcting a cutting position based on the detected deviation.

REMARKS

Claims 2, 5 and 13-34 having been withdrawn from consideration, Claims 1, 3, 4 and 6-12 are now presented for examination. Claims 1, 4, 7 and 11 has been amended to define still more clearly what Applicants regard as their invention, in terms which distinguish over the art of record. Claims 1, 4, 7 and 11 are the only independent claims under consideration.

Claims 1, 4, 7, 10 and 11 have been rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over U.S. Patent No. 3,398,620 (Gautron). Claims 3, 8, 9 and 12 have been rejected under 35 U.S.C. § 103(a) as unpatentable over Gautron. With regard to the claims as amended, these rejections are respectfully traversed.

Independent Claim 1, as amended by this amendment, is directed to a substrate cutting method for cutting a substrate of a thin semiconductor device constructed by arranging plural substrates adjacently like a plane. On each of the plural substrates, two dimensionally arranged thin film semiconductor elements are installed. According to the method, a substrate is cut that has a slice line provided thereon and a guide line provided which corresponds to and is different from the slice line. The position of the guide line is detected and the cutting position is corrected while the substrate is cut along the slice line.

Independent Claim 4, as amended by this amendment, is directed to a substrate cutting method for cutting a substrate of a thin semiconductor device constructed by arranging plural substrates adjacently like a plane. On each of the plural substrates, two dimensionally arranged thin film semiconductor elements are installed. According to the method, a substrate is cut that has a slice line provided thereon and a guide line provided that corresponds to and is different from the slice line. A position of the guide line is detected and the cutting position is corrected while the substrate is cut along the slice line. The guide line is an electrode line provided on the substrate.

Independent Claim 7, as amended by this amendment, is directed to a method for cutting a substrate of a thin semiconductor device constructed by arranging plural substrates adjacently like a plane. On each of the plural substrates, two dimensionally arranged thin film semiconductor elements are installed. According to the method, a substrate having an electrode layer provided thereon is cut. The position of a guide line provided that corresponds to the slice line formed by the electrode layer is detected. The cutting position is corrected based on the detection.

Independent Claim 11, as amended by this amendment, is directed to a substrate cutting method for cutting a substrate of a thin semiconductor device constructed by arranging plural substrates adjacently like a plane. On each of the plural substrates, two dimensionally arranged thin film semiconductor elements are installed. According to the method, the substrate provided with a slice line and a guide line along the slice line of the substrate is cut. The guide line is detected during the cutting to detect a deviation with respect to the guide line. The cutting position is corrected based on the detected deviation.

The features of Claims 1, 4, 7 and 11 of substrate of a thin semiconductor device constructed by arranging plural

substrates adjacently like a plane wherein each of the plural substrates has two dimensionally arranged thin film semiconductor elements installed is shown in the drawings and is disclosed at least at lines 9 through 15 of page 1 of the specification. No new matter is believed to have been added.

The invention defined in Claims 1, 4, 7 and 11, as amended by this amendment, is directed to producing a semiconductor device constructed by arranging plural substrates adjacently in a plane. Each substrate is cut along a slice line provided on the substrate. The position of a guide line on the substrate is detected and the cutting position is corrected while the substrate is cut along the slice line. In Claims 1 and 4, the guide line is different from the slice line. In Claims 4 and 7, the guide line is an electrode line or an electrode layer provided on the substrate. In Claim 11, the guide line is along the slice line of the substrate. Advantageously, the correcting of the cutting position according to the detected position of the guide line permits the arrangement of the plural substrates in adjacent positions in a plane. In the case of a photoelectric converting device, the use of plural substrates arranged adjacently in a plane substantially improves the yield per substrate apparatus and provides substantial cost reduction.

In Applicants' view, Gautron discloses an arrangement for cutting sheet material using pivotally mounted shears for cutting the sheet material and means to move the sheet material relative to the shears. The sheet material is loosely guided with respect to the shears and the angle of the shears is adjusted responsive to angular variations of the sheet material.

It is a feature of Claims 1, 4, 7 and 11, as amended by this amendment, that the substrate to be cut that has a slice line and a guide line is one of plural substrates of a thin film semiconductor device constructed by adjacently arranging the plurality of substrates like a plane, each substrate having two-dimensionally arranged thin film semiconductor elements installed thereon. Gautron may teach a sheet material cutting arrangement in which the angle of cutting shears is adjusted responsive to detected variations along a guiding wire on the sheet material. Gautron, however, neither discloses nor suggests a method for cutting substrates of a plurality of substrates having two-dimensional thin film elements thereon which substrates are to be arranged adjacently in a plane as in Claims 1, 4, 7 and 11.

Further, Gautron only teaches the use of a guide wire separate from a sheet material with electrode sensors which is directed away from and fails to suggest in any manner the relationship between a slice line and a guide line for an

adjacent arrangement of plural substrates in a plane as in Claims 1, 4, 7 and 11 where adjacency of the cut substrates is an important consideration. More particularly, Gautron's guide wire and electrode sensor structure is devoid of any suggestion for a guide line provided on a substrate that is different from the slice line as in Claims 1 and 4, a guide line that is an electrode line or an electrode layer on the substrate as in Claims 4 and 7 or a guide line that is along the slice line of the substrate as in Claim 11. Accordingly, it is believed that Claims 1, 4, 7 and 11, as amended by this amendment, are completely distinguished from Gautron and are allowable.

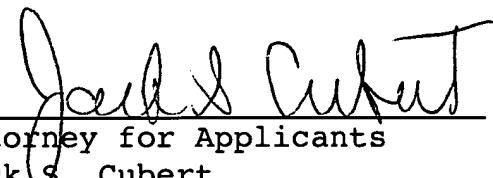
A review of the other art of record has failed to reveal anything which, in Applicants' opinion, would remedy the deficiencies of the art discussed above, as references against the independent claims herein. Those claims are therefore believed patentable over the art of record.

The other claims in this application are each dependent from one or another of the independent claims discussed above and are therefore believed patentable for the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual reconsideration of the patentability of each on its own merits is respectfully requested.

In view of the foregoing amendments and remarks,  
Applicants respectfully request favorable reconsideration and  
early passage to issue of the present application.

Applicants' attorney, Steven E. Warner, may be reached in  
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Respectfully submitted,

  
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VERSION WITH MARKINGS TO SHOW CHANGES MADE TO THE CLAIMS

1. (Twice Amended) A substrate cutting method for  
cutting a substrate of a thin film semiconductor device  
constructed by adjacently arranging like a plane a plurality of  
substrates on each of which thin film semiconductor elements  
which are two-dimensionally arranged are installed comprising:

cutting a substrate having a slice line provided on the  
substrate and a guide line provided, which corresponds to the  
slice line and is different from the slice line; and

detecting a position of the guide line and correcting a  
cutting position while the substrate is cut along the slice line.

4. (Twice Amended) A substrate cutting method for  
cutting a substrate of a thin film semiconductor device  
constructed by adjacently arranging like a plane a plurality of  
substrates on each of which thin film semiconductor elements  
which are two-dimensionally arranged are installed comprising:

cutting a substrate having a slice line provided on the  
substrate and a guide line provided, which corresponds to the  
slice line and is different from the slice line; and

detecting a position of the guide line and correcting a  
cutting position while the substrate is cut along the slice line,

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wherein the guide line is an electrode line provided on the substrate.

7. (Twice Amended) A substrate cutting method for cutting a substrate of a thin film semiconductor device constructed by adjacently arranging like a plane a plurality of substrates on each of which thin film semiconductor elements which are two-dimensionally arranged are installed comprising:

cutting a substrate having an electrode layer provided on the substrate;

detecting, during the cutting, a position of a guide line provided corresponding to a slice line formed by the electrode layer; and

correcting a cutting position based on the detection in said detecting step.

11. (Twice Amended) A substrate cutting method for cutting a substrate of a thin film semiconductor device constructed by adjacently arranging like a plane a plurality of substrates on each of which thin film semiconductor elements which are two-dimensionally arranged are installed comprising:

cutting a substrate, provided with a slice line and a guide line, along the slice line of the substrate;

detecting the guide line during the cutting to detect deviation with respect to the guide line; and  
correcting a cutting position based on the detected deviation.